

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
 Organization
 International Bureau



(43) International Publication Date
 15 July 2004 (15.07.2004)

PCT

(10) International Publication Number
WO 2004/058550 A2

(51) International Patent Classification⁷:

B60T

(74) Agent: MALOOLEY, Marc, F.; Brooks & Kushman,
 1000 Town Center, Twenty-Second Floor, Southfield, MI
 48075 (US).

(21) International Application Number:

PCT/US2003/040096

(22) International Filing Date:

16 December 2003 (16.12.2003)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/433,566 ✓	16 December 2002 (16.12.2002)	US
60/441,194 ✓	21 January 2003 (21.01.2003)	US
60/452,714 ✓	10 March 2003 (10.03.2003)	US
Not furnished	23 October 2003 (23.10.2003)	US
Not furnished	15 November 2003 (15.11.2003)	US

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant and

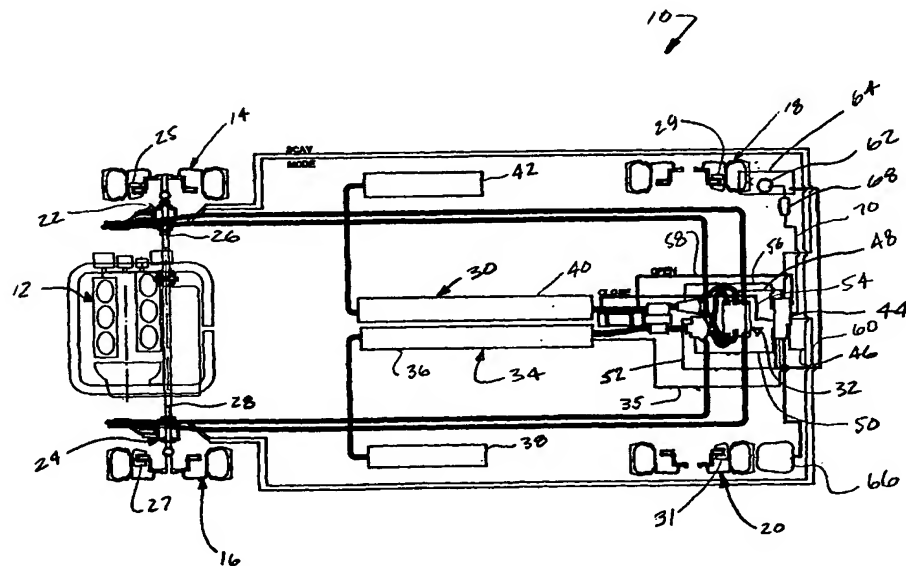
(72) Inventor: WALKER, Frank, H. [US/US]; 8087
 Hawkcrest Drive, Grand Blanc, MI 48439 (US).

Published:

— without international search report and to be republished
 upon receipt of that report

[Continued on next page]

(54) Title: HYDRAULIC REGENERATIVE BRAKING SYSTEM FOR A VEHICLE



(57) Abstract: A hydraulic regenerative braking system for a vehicle is provided. The system includes two hydraulic machines, each of which is disposed proximate a corresponding vehicle wheel. A transformer is in communication with each of the hydraulic machines, and with a pair of accumulators. Each of the hydraulic machines is operable as a pump, pumping fluid to at least one of the accumulators when the vehicle is braking. Each of the hydraulic machines is also operable as a motor, receiving pressurized fluid and transferring torque to the vehicle wheels. The transformer is operable to vary the pressure of the fluid received by the hydraulic machines.